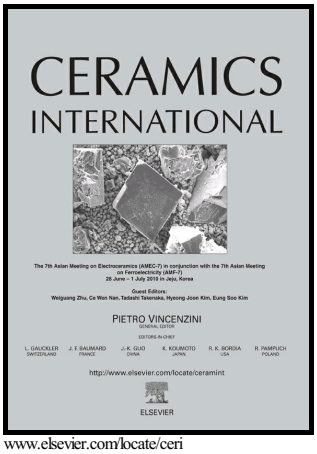
Tailoring the grain size of zirconia polycrystalline fibers by cetyltrimethyl ammonium bromide

Benxue Liu, Luyi Zhu, Dong Xu, Xibin Yi, Wei Ju, Jing Zhang, Huili Fan, Qichun Wang



www.elsevier.com/locate/ceri

PII: S0272-8842(17)30883-0
DOI: http://dx.doi.org/10.1016/j.ceramint.2017.05.078
Reference: CERI15238

To appear in: *Ceramics International*

Received date: 22 March 2017
Revised date: 5 May 2017
Accepted date: 10 May 2017

Cite this article as: Benxue Liu, Luyi Zhu, Dong Xu, Xibin Yi, Wei Ju, Jing Zhang, Huili Fan and Qichun Wang, Tailoring the grain size of zirconia polycrystalline fibers by cetyltrimethyl ammonium bromide, *Ceramic International,* http://dx.doi.org/10.1016/j.ceramint.2017.05.078

Tailoring the grain size of zirconia polycrystalline fibers by cetyltrimethyl ammonium bromide.

Benxue Liu[1, 2], Luyi Zhu [2*], Dong Xu[2*], Xibin Yi [1], Wei Ju [1], Jing Zhang [1], Huili Fan [1], Qichun Wang [1].

1, Advanced Materials Institute, Shandong Academy of Sciences, Jinan 250014, P. R. China.

2, State Key Laboratory of Crystal Materials and Institute of Crystal Materials, Shandong University, Jinan 250100, P. R. China.

Abstract:

In the study, cetyltrimethyl ammonium bromide (CTAB) has been found to have a significant effect on the grain size of zirconia (ZrO_2) polycrystalline fibers from a precursor of polyacetylacetonatozirconium (PAZ). A relation between the variation in the grain size of the fibers sintered at 1000 °C for 1 h and CTAB addition has been established by scanning electron microscopy (SEM) and matching the results by a Gaussian Function. The grain size increased firstly and then decreased at an elevated weight percent of CTAB with respect to PAZ. ZrO_2 nucleation at 500 °C and grain growth during thermal treatment between 500-1000 °C were investigated by thermal analysis (TG-DTA), X-ray photoelectron spectroscopy (XPS), high resolution transmission electron microscopy (HRTEM) and X-ray diffraction (XRD). The results indicate that the addition of CTAB accelerated the decomposition of PAZ. The

*Corresponding author.

Email addresses: Luyi Zhu, Zhuly@sdu.edu.cn, Dong Xu, xdoffice@sdu.edu.cn.